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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,651	09/26/2003	Charles E. Lents	02-161A	8208

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EXAMINER	
DOERRLER, WILLIAM CHARLES	
ART UNIT	**PAPER NUMBER**
3744	

DATE MAILED: 09/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/672,651	LENTS ET AL.	
	Examiner	Art Unit	
	William C Doerrler	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *37-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *49* is/are allowed.

6)☒ Claim(s) *37-48 and 50-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 37-40,42-44,51-55,58,59,61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams '103 in view of Campbell (4,198,830).

Williams '103 discloses applicants' basic inventive concept, an air cycle cooling system which splits ram air, compresses one stream, cools the compressed air using the remainder of the ram air and uses the cooled compressed air to treat the air in an aircraft, substantially as claimed with the exception of using a precooler/reheater heat exchanger and a water separator integral with a condenser heat exchanger to separate water droplets from the cooled air between the precooler and a cooling turbine.

Campbell shows this feature to be old in the air cycle cooling art. It would have been obvious to one of ordinary skill in the art at the time of applicants' invention from the teaching of Campbell to modify the air cycle cooling system of Williams '103 by using a second heat exchanger to transfer heat from the compressed air to expanded air and adding a water separator to remove water droplets from the air stream prior to passing through a turbine to improve the lifespan and efficiency of the turbine and increase the comfort of the occupants. In regard to claim 42, it is noted that figure 2 of Williams shows an electric motor 3, compressor 5 and turbine 9 on a common shaft. Lines 26-35 of Campbell state that the water separated from the compressed air can be used to cool the stream which is used to cool the compressed air.

Claims 39-48,50-56 and 58-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams '103 in view of Brunskill.

Williams '103 discloses applicants' basic inventive concept, an air cycle cooling system which splits ram air, compresses one stream, cools the compressed air using the remainder of the ram air and uses the cooled compressed air to treat the air in an aircraft, substantially as claimed with the exception of using a precooler/reheater heat exchanger and a water separator to separate water droplets from the cooled air between the precooler and a cooling turbine. Brunskill shows this feature to be old in the air cycle cooling art. It would have been obvious to one of ordinary skill in the art at the time of applicants' invention from the teaching of Brunskill to modify the air cycle cooling system of Williams '103 by using a second heat exchanger to transfer heat from the compressed air to expanded air and adding a water separator to remove water

droplets from the air stream prior to passing through a turbine to improve the lifespan and efficiency of the turbine. In regard to claim 41, line 340 of Brunskill represents a bypass line with valve 342 controlling the amount of bypass air which is mixed with cooled air entering and being mixed in line 13. Williams' generator 7 in figure 1 is mounted on a second shaft with cooling turbine 9 and the electricity produced therefrom enters controller 11 before being used to power electric motor 3 which powers compressor 5. Line 51 of Brunskill transports water which has been separated from the cooled compressed air to the ram air which is used to cool the compressed air. Valve 22 of Williams shows the control of air leaving the cabin. In regard to claim 50 Brunskill shows valve 68 which controls a bypass for the compressed air to control the temperature. In regard to claim 42 Williams shows in figure 2 a shaft containing an electric motor, a turbine and a compressor.

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Williams '103 in view of Brunskill as applied to claims 37-41,43-47,50-56 and 58 above, and further in view of Cronin et al.

Williams '103, as modified, discloses applicants' basic inventive concept, an air cycle cooler which splits ram air into a compressed stream and a heat transfer stream, substantially as claimed with the exception of a recovery heat exchanger in a system mounting a turbine, compressor and electric motor on a common shaft. Cronin et al shows this feature to be old in the air cycle cooler art with heat exchanger 24 recovering heat and figure 4 showing the common shaft. It would have been obvious to one of ordinary skill in the art at the time of applicants' invention from the teaching of Cronin et

al to modify the air cycle cooler of Williams by adding a recovery heat exchanger to improve the efficiency of the system by recovering energy that would be discarded in the form of thermally treated air.

Claim 57 rejected under 35 U.S.C. 103(a) as being unpatentable over Williams '103 in view of Brunskill as applied to claims 37-41,43-447,50-56 and 58 above, and further in view of any one of Afeiche et al, Hipsky or Murry et al.

Williams '103, as modified, discloses applicants' basic inventive concept, an air cycle cooler which splits ram air into a compressed stream and a heat transfer stream, substantially as claimed with the exception of using a second turbine to expand the dry air. Afeiche et al, Hipsky and Murry et al each show this feature to be old in the air cycle cooler art. It would have been obvious to one of ordinary skill in the art at the time of applicants' invention from the teaching of any one of Afeiche et al, Hipsky or Murry et al to modify the air cycle cooler of Williams by adding a second turbine to further expand the dry air to improve the control of the system by enabling a constant (or linked) rotation speed for one turbine while controlling the other to derive the desired temperature and pressure of the air.

Allowable Subject Matter

Claim 49 is allowable

Response to Arguments

Applicant's arguments filed 8-13-2004 have been fully considered but they are not persuasive. Applicant has stated that no motivation to combine exists. This is not

true. Both Campbell (which is newly applied) and Brunskill clearly teach the use of water eliminators in air cycle cooling systems (which Williams certainly is). Campbell states that the water "may be conducted to spray nozzles (not shown) at the intake of the heating pass of the heat exchanger 22, to impart additional cooling to the source air conducted through the cooling pass thereof (col. 3 lines 30-35). A similar statement can be found in lines 37-43 of column 5 of Brunskill. This also ignores that water separators are common in air cycle cooling systems to prevent ice formation following expansion. Both secondary references clearly teach that water can be separated from the compressed air stream of an air cycle cooler and be used to cool the ram air stream used to cool the compressed air stream to improve the cooling the cooling of the compressed air stream. This teaching is clearly applicable to Williams.

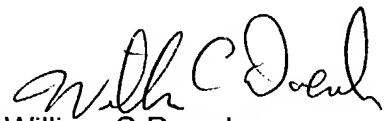
Campbell and Brunskill both show expanded air leaving the expander and traveling through the condenser heat exchanger prior to entering the cabin. In Brunskill air is expanded in turbine 22, passes through condenser heat exchanger 14 or 314 and passes through conduit 13 to be distributed in the cabin. Likewise the air in Campbell is expanded in turbine 58, passes through heat exchanger 40 and passes through conduit 14 to be distributed. IN regard to claim 41, Brunskill shows line 340 to mix cold expaned air with engine bypass air to control the temperature of air entering the cabin. In regard to claim 44, Williams system/motor controller 11 is seen as a power conversion unit. In regard to claim 50, Brunskill shows valves 68 and 72 which control the flow of compressed air to remove a portion thereof from the heat exchanger to control the temperature thereof. In regard to claim 57, Afeiche et al, Hipsky and Murry

et al all show the use of second turbines following the condenser heat exchanger to further expand dried air. Williams Clearly shows the subject matter of claim 58. The new claims are seen as taught by the references as none of the references show a means to reduce pressure between the turbine and the cabin, so it is assumed that the air leaves the turbine at approximately cabin pressure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C Doerrler whose telephone number is (703) 308-0696. The examiner can normally be reached on Monday-Friday 6:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Denise Esquivel can be reached on (703) 308-2597. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



William C Doerrler
Primary Examiner
Art Unit 3744

WCD